



## LANGUAGE AS MATHEMATICS: A COMPARISON BETWEEN ENGLISH AND ARABIC

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### ABSTRACT

The similarity between language and mathematics is sometimes obvious. In mathematics, we rely on axioms through which we infer and construct certain conclusions. Similarly, in language, we rely on the rules of grammar in light of which we infer and form accurate statements. In this sense, there is in fact a similarity between language and mathematics. But is language mathematics? In a certain sense, language is mathematics, as this article attempts to demonstrate.

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### An Equation of English Language

We could analyze language in terms of mathematical equations. One example of a mathematical equation of language is the following: the subject plus the verb is equal to an accurate linguistic construction. In accordance with this equation, we are supposed to derive grammatically accurate linguistic forms through replacing the subject and the verb with actual subjects and verbs. And in fact this turns out to be true, leading to the conclusion that the subject plus the verb formula is a true mathematical equation of language. For example, in English language, the subject in the equation could be replaced with "The family", while the verb could be replaced with "is eating". Hence, we will have the grammatically accurate statement "The family is eating".

Now, since "the subject plus the verb" is a mathematical equation of English, it follows that "the verb plus the subject" should also be an accurate equation in English language, given that the subject plus the verb is mathematically equal to the verb plus the subject. This prediction is also true.

If we put the verb at the beginning and then the subject, using the previous example "The family is eating", we will have "Is the family eating?" And the latter linguistic form, i.e., "Is the family eating?" is a grammatically accurate linguistic construction in English. This shows that the equation the subject plus the verb leads to the construction of statements in English, such as "The family is eating", while the equation the verb plus the subject leads to the construction of questions in English, such as "Is the family eating?" And all of this reveals that the equation the subject plus the verb paves the way for the formation of both statements and questions in English, given that the subject plus the verb is mathematically equal to the verb plus the subject.

### The Universality of the Equation

The same equation is dominant in Arabic language. Through replacing the subject and the verb in the equation with any actual subject and verb in Arabic, we will have different grammatically accurate statements in Arabic. For example, through replacing the subject with "Al-aa-ela", which means the family, and replacing the verb with "Ta-kol",

which means "is eating", the grammatically accurate Arabic statement "Al-aa-ela Ta-kol", i.e. "The family is eating", follows. Yet since the subject plus the verb is mathematically equal to the verb plus the subject, it follows that the equation the verb plus the subject should be a true equation of Arabic, exactly as the equation the subject plus the verb is. And in fact it is so. For instance, through putting the verb "Ta-kol" at the beginning and then the subject "Al-aa-ela" after the verb, we will have the grammatically accurate statement in Arabic "Ta-kol Al-aa-ela", which is equivalent in meaning to "The family is eating". The equation the subject plus the verb leads to the formation of grammatically diverse and accurate statements in Arabic because in Arabic language we can accurately put the subject first and then the verb, and vice versa. All of this shows the dominance of the subject plus the verb formula in Arabic language.

We have seen that the previous equation is a basic equation of Arabic and English. This reveals that it is highly probable that the equation the subject plus the verb is a universal mathematical equation common among different languages. Thus, it is probable that there is a universal grammar as Noam Chomsky said. According to Chomsky, the universal grammar shared by all languages is biological; we are born with it, and it resides in our genes. But in light of this inquiry, presented in this article, the universal grammar is mathematical. The mathematical theory of language holds that language is mathematics, contrary to what Chomsky maintained. And thus, this theory states that languages are formed in accordance with mathematical equations. The mathematical theory of language is just a roadmap encouraging others to discover the hidden mathematical equations of our languages.

#### **The Flexibility Case**

Although there are many similarities between English and Arabic, especially with respect to some basic rules of grammar, Arabic language is highly flexible in comparison with English. The flexibility of Arabic is usually discussed under the title "the secrets of Arabic language", as the linguist Al-Thaalibi did. We have seen that in Arabic we could put the subject first then the verb and vice versa, as

we did with the subject "Al-aa-ela" and the verb "Ta-kol". In both cases, we would be expressing the same statement, which is "The family is eating". And we can legitimately do that in Arabic because of the equation that the subject plus the verb is equal to accurate linguistic form in Arabic language.

But in English we can't put the verb first and then the subject in order to form a statement, such as "The family is eating". Rather, if we do that, we will have a question. In this sense, Arabic is more flexible than English with regard to the formation of statements. And the reason why this is so resides in the mathematical formula that the subject plus the verb is equal to grammatically genuine linguistic construction. Arabic language took this formula to its final conclusion, while English didn't. In Arabic language, if the subject plus the verb leads to grammatically accurate linguistic statements, then the verb plus the subject should lead to the same result. Yet this conclusion was not inferred in English, and thus it was not accepted. This is why Arabic is more flexible than English.

In conclusion, language is mathematics, and we can successfully analyze and explain language in terms of mathematical equations. According to modern science, we could explain the whole universe through mathematical equations, which we call the laws of nature. If this is true, then we could also explain language in terms of mathematics, given that language is part of the universe.

#### **References**

1. Al-Thaalibi, Abu Mansur: *Fiqh Al-Lugha*. (Arabic Edition). 2007. Beirut, Lebanon. Al-Arqam Publishing House.
2. Chomsky, Noam: *Language and Problems of Knowledge*. 1988. MIT.

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